

*AMENDED*

## **Claims**

1. Method for producing electricity from the heat produced in the core (5) of at least one high temperature nuclear reactor (1), which involves circulating a first heat-exchange gas or coolant gas in contact with the core (5) of the nuclear reactor (1) in a closed circuit, heating a second heat-exchange gas by heat-exchange with the first heat-exchange gas and using the second heat-exchange gas heated by the first heat-exchange gas to drive at least one gas turbine (2) coupled to an electric generator (4), characterised in that the first exchange gas consists of helium, in that the second exchange gas contains substantially 50 to 70% by volume of helium and 50 to 30% by volume of nitrogen, in that the second heat-exchange gas is circulated in a closed circuit so that the second heat-exchange gas heated by the first heat-exchange gas drives the at least one gas turbine (2) and in that at least a first portion of the heat from the second exchange gas which has passed through the gas turbine (2) is recovered in order to heat and vaporise water in at least one steam generator (12) so as to produce steam for driving at least one steam turbine (3a, 3b, 3c) coupled to the electric generator (4).
2. Method according to claim 1, characterised in that at least a second portion of the heat from the second exchange fluid is recovered in order to supply heat to an auxiliary installation (30) such as an urban heating system or a seawater desalination plant.
3. Method according to either of claims 1 and 2, characterised in that at least a fraction of the heat from the second heat-exchange gas heated by the first heat-exchange fluid is recovered to fulfil, prior to the driving of the gas turbine (2), a function such as the production of hydrogen which necessitates a very high temperature fluid.
4. Method according to any of claims 1 to 3, characterised in that the second heat-exchange gas is heated by

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